



PATENT  
Attorney Docket No.: 16869K-093600US  
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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re application of:

SEIJI KANEKO

Application No.: 10/656,493

Filed: September 5, 2003

For: CONTROL METHOD FOR  
STORAGE DEVICE  
CONTROLLER SYSTEM, AND  
STORAGE DEVICE  
CONTROLLER SYSTEM

Customer No.: 20350

Examiner: Unassigned

Technology Center/Art Unit: 2186

Confirmation No.: 8359

**PETITION TO MAKE SPECIAL FOR  
NEW APPLICATION UNDER M.P.E.P.  
§ 708.02, VIII & 37 C.F.R. § 1.102(d)**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

This is a petition to make special the above-identified application under MPEP § 708.02, VIII & 37 C.F.R. § 1.102(d). The application has not received any examination by an Examiner.

(a) The Commissioner is authorized to charge the petition fee of \$130 under 37 C.F.R. § 1.17(i) and any other fees associated with this paper to Deposit Account 20-1430.

(b) All the claims are believed to be directed to a single invention. If the Office determines that all the claims presented are not obviously directed to a single invention, then Applicants will make an election without traverse as a prerequisite to the grant of special status.

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(c) Pre-examination searches were made of U.S. issued patents, including a classification search and a computer database search. The searches were performed on or around October 11, 2004, and were conducted by a professional search firm, Kramer & Amado, P.C. The classification search covered Class 710 (subclasses 1, 63, AND 65) and Class 711 (subclasses 112, 147, 162, and 170) for the U.S. and foreign subclasses identified above. The computer database search was conducted on the USPTO systems EAST and WEST. The literature search was conducted on the Internet for relevant non-patent documents. The search for foreign patent documents was performed on the Espacenet and Delphion databases. The inventors further provided one reference considered most closely related to the subject matter of the present application (see reference #10 below), which was cited in the Information Disclosure Statements filed on September 5, 2003.

(d) The following references, copies of which are attached herewith, are deemed most closely related to the subject matter encompassed by the claims:

- (1) U.S. Patent No. 5,920,893;
- (2) U.S. Patent No. 6,041,386;
- (3) U.S. Patent No. 6,425,051;
- (4) U.S. Patent No. 6,735,676 B1;
- (5) U.S. Patent Publication No. 2001/0052037 A1;
- (6) U.S. Patent Publication No. 2003/0221077 A1;
- (7) U.S. Patent Publication No. 2003/0229764 A1;
- (8) U.S. Patent Publication No. 2004/0044803 A1;
- (9) Japanese Patent Publication No. JP 2002-027373; and
- (10) Japanese Patent Publication No. JP 2000-029635.

(e) Set forth below is a detailed discussion of references which points out with particularity how the claimed subject matter is distinguishable over the references.

A. Claimed Embodiments of the Present Invention

The claimed embodiments relate to a method for completely shifting from operation of the old storage control device to only the newly introduced storage control device, and a method for operating the old storage control device and the newly introduced storage device side-by-side.

Independent claim 1 recites a control method for a storage device controller system. The storage device controller system comprises a first storage device controller having a first input/output control module for performing input/output processing with respect to a first storage device storing data in accordance with a first recording format, a second input/output control module for performing input/output processing with respect to a second storage device storing data in accordance with a second recording format, a first communications control module for receiving data input/output requests from a first information processing device for accessing data stored on the first storage device, and a second communications control module for receiving data input/output requests from a second information processing device for accessing data stored on the second storage device; and a second storage device controller having a third input/output control module for performing input/output processing with respect to a third storage device storing data in accordance with the second recording format, and a third communications control module for receiving input/output requests with respect to data stored on the third storage device. The second communications control module and the third communications control module are connected. The control method comprises the first storage device controller receiving a data read request from the first information processing device; and the first storage device controller determining whether the data read request is for data stored on the third storage device. If it is determined that the data read request is for data stored on the third storage device, then the method further comprises the first storage device controller transmitting the data read request to the second storage device controller; the second storage device controller reading out data stored on the third storage device and transmitting the data to the first storage device controller; and the first storage device controller transmitting the data to the first information processing device.

Independent claim 5 recites a control method for a storage device controller system. The storage device controller system comprises a first storage device controller

having a first input/output control module for performing input/output processing with respect to a first storage device storing data in accordance with a first recording format, a second input/output control module for performing input/output processing with respect to a second storage device storing data in accordance with a second recording format, a first communications control module for receiving data input/output requests from a first information processing device for accessing data stored on the first storage device, and a second communications control module for receiving data input/output requests from a second information processing device for accessing data stored on the second storage device; and a second storage device controller having a third input/output control module for performing input/output processing with respect to a third storage device storing data in accordance with the second recording format, and a third communications control module for receiving input/output requests with respect to data stored on the third storage device. The second communications control module and the third communications control module are connected. The control method comprises the first storage device controller receiving a data write request from the first information processing device; and the first storage device controller determining whether the data write request is for the third storage device. If it is determined that the data write request is for the third storage device, then the method further comprises the first storage device controller transmitting the data write request to the second storage device controller; the first storage device controller transmitting write data received from the first information processing device to the second storage device controller; and the second storage device controller writing the write data to the third storage device.

Independent claim 9 recites a storage device controller system comprising a first storage device controller having a first input/output control module for performing input/output processing with respect to a first storage device storing data in accordance with a first recording format, a second input/output control module for performing input/output processing with respect to a second storage device storing data in accordance with a second recording format, a first communications control module for receiving data input/output requests from a first information processing device for accessing data stored on the first storage device, and a second communications control module for receiving data input/output requests from a second information processing device for accessing data stored on the second storage device; and a second storage device controller having a third input/output control

module for performing input/output processing with respect to a third storage device storing data in accordance with the second recording format, and a third communications control module for receiving input/output requests with respect to data stored on the third storage device. The second communications control module and the third communications control module are connected. The first storage device controller comprises means for receiving a data read request from the first information processing device; means for determining whether the data read request is for data stored on the third storage device; means for transmitting the data read request to the second storage device controller if it is determined that the data read request is for data stored on the third storage device; and means for transmitting to the first information processing device the data stored on the third storage device that are transmitted from the second storage device controller. The second storage device controller comprises means for reading out data stored on the third storage device and transmitting the data to the first storage device controller based on the data read request that is transmitted from the first storage device controller.

One of the benefits that may be derived is that it is possible to provide a control method for a storage device controller system and a storage device controller system that allow existing storage devices to be accessed regardless of the computer type.

B. Discussion of the References

1. U.S. Patent No. 5,920,893

This reference discloses a storage control and computer system using the same, having the data format (CKD format) of the main frame different from the data format (FBA format) of the host computer input/output interface, a program for data conversion and data conversion between host computers and a storage control devoted to each host computer input/output interface. See column 2, lines 20-35.

The reference is directed to storage control that enables data on different storage media to be shared among host computers with different I/O interfaces. It does not teach a control technique in which:

(1) the first storage device controller receives a data input/output (read/write) request from the first information processing device; and

(2) either (a) if it is determined that the data read request is for data stored on the third storage device, then the first storage device controller transmits the data read request to the second storage device controller, the second storage device controller reads out data stored on the third storage device and transmits the data to the first storage device controller, and the first storage device controller transmits the data to the first information processing device, as recited in independent claims 1 and 9; or (b) if it is determined that the data write request is for the third storage device, then first storage device controller transmits the data write request to the second storage device controller, the first storage device controller transmits write data received from the first information processing device to the second storage device controller, and the second storage device controller writes the write data to the third storage device, as recited in independent claim 5.

2. U.S. Patent No. 6,041,386

This reference discloses a system having a CDK device, a FBA device, a storage controller and an open system host. It further shows a storage controller interface that controls input/output operations between a CKD host and an open systems host with a direct access storage device, having the storage controller interfacing between a DASD and host computers, providing access to FBA and CKD formatted data. See column 3, lines 35-42.

The reference is directed to data sharing between storage systems having different data storage formats. It does not teach a control technique in which:

- (1) the first storage device controller receives a data input/output (read/write) request from the first information processing device; and
- (2) either (a) if it is determined that the data read request is for data stored on the third storage device, then the first storage device controller transmits the data read request to the second storage device controller, the second storage device controller reads out data stored on the third storage device and transmits the data to the first storage device controller, and the first storage device controller transmits the data to the first information processing device, as recited in independent claims 1 and 9; or (b) if it is determined that the data write request is for the third storage device, then first storage device controller transmits the data write request to the second storage device controller, the first storage device controller transmits write data received from the first information processing device to the second storage device

controller, and the second storage device controller writes the write data to the third storage device, as recited in independent claim 5.

3. U.S. Patent No. 6,425,051

This reference relates to a method, system, program, and data structures for enabling a controller accessing a storage device to handle requests to data in a first data format when the storage device includes data in a second data format. A component is provided that is capable of accessing storage blocks in the second format in cache using the control block if the storage unit data structure includes a pointer to the control block.

The reference is directed to enabling a controller accessing a storage device to handle requests to data in a first data format when the storage device includes data in a second data format. It does not teach a control technique in which:

- (1) the first storage device controller receives a data input/output (read/write) request from the first information processing device; and
- (2) either (a) if it is determined that the data read request is for data stored on the third storage device, then the first storage device controller transmits the data read request to the second storage device controller, the second storage device controller reads out data stored on the third storage device and transmits the data to the first storage device controller, and the first storage device controller transmits the data to the first information processing device, as recited in independent claims 1 and 9; or (b) if it is determined that the data write request is for the third storage device, then first storage device controller transmits the data write request to the second storage device controller, the first storage device controller transmits write data received from the first information processing device to the second storage device controller, and the second storage device controller writes the write data to the third storage device, as recited in independent claim 5.

4. U.S. Patent No. 6,735,676 B1

This reference discloses a data storage system comprising: a storage unit for storing data; a first interface for performing data transfer complying with CKD format with the first computer; a second interface for performing data transfer complying with FBA format with the second computer; a storage control unit comprises: a first unit, responsive to

a write request with a CKD format received and with the CKD format corresponding to an address complying with a FBA format, storing a data portion in a FBA format accompanying a write request, a second unit, responsive to a read request specifying an address complying with the FBA format received and a third unit for transferring data portion.

The reference is directed to sharing storage device using mutually different interfaces. It does not teach a control technique in which:

- (1) the first storage device controller receives a data input/output (read/write) request from the first information processing device; and
- (2) either (a) if it is determined that the data read request is for data stored on the third storage device, then the first storage device controller transmits the data read request to the second storage device controller, the second storage device controller reads out data stored on the third storage device and transmits the data to the first storage device controller, and the first storage device controller transmits the data to the first information processing device, as recited in independent claims 1 and 9; or (b) if it is determined that the data write request is for the third storage device, then first storage device controller transmits the data write request to the second storage device controller, the first storage device controller transmits write data received from the first information processing device to the second storage device controller, and the second storage device controller writes the write data to the third storage device, as recited in independent claim 5.

5. U.S. Patent Publication No. 2001/0052037 A1

This reference relates to an image input/output control apparatus and image input/output system, having a format (first format) of input/output data to be stored in the storage section of the information terminal apparatus and a format (second format) of input/output data that is handled by each of the image reading section, the image printing section, and the fax transmitting section of the image input/output apparatus in performing image input or output. See [0037].

The reference is directed to image input/output control using a different data format from the format of input/output data to be stored. It does not teach a control technique in which:



(1) the first storage device controller receives a data input/output (read/write) request from the first information processing device; and

(2) either (a) if it is determined that the data read request is for data stored on the third storage device, then the first storage device controller transmits the data read request to the second storage device controller, the second storage device controller reads out data stored on the third storage device and transmits the data to the first storage device controller, and the first storage device controller transmits the data to the first information processing device, as recited in independent claims 1 and 9; or (b) if it is determined that the data write request is for the third storage device, then first storage device controller transmits the data write request to the second storage device controller, the first storage device controller transmits write data received from the first information processing device to the second storage device controller, and the second storage device controller writes the write data to the third storage device, as recited in independent claim 5.

6. U.S. Patent Publication No. 2003/0221077 A1

This reference relates to a method for controlling storage system, and storage control apparatus, having a first storage control apparatus, analyzing the first command contained in the first data input/output request and creating the second command which is a data read-out command that the second storage control apparatus can execute; transmitting by a first storage control apparatus to a second storage control apparatus with the second data input/output request in which the second command is set; by a second storage control apparatus, receiving a second data input/output request, executing the second command in the second data input/output request and transmitting the read out data to the first storage control apparatus; and by a first storage control apparatus, receiving a data and transmitting the data to a third storage control apparatus connected communicatively to the first storage control apparatus.

The reference is directed to effective use of old and new storage control apparatus. Although the reference also relates to the use of old storage control apparatus while introducing new storage control apparatus, it does not teach a control technique in which:

(1) the first storage device controller receives a data input/output (read/write) request from the first information processing device; and

(2) either (a) if it is determined that the data read request is for data stored on the third storage device, then the first storage device controller transmits the data read request to the second storage device controller, the second storage device controller reads out data stored on the third storage device and transmits the data to the first storage device controller, and the first storage device controller transmits the data to the first information processing device, as recited in independent claims 1 and 9; or (b) if it is determined that the data write request is for the third storage device, then first storage device controller transmits the data write request to the second storage device controller, the first storage device controller transmits write data received from the first information processing device to the second storage device controller, and the second storage device controller writes the write data to the third storage device, as recited in independent claim 5.

7. U.S. Patent Publication No. 2003/0229764 A1

This reference relates to a data storage subsystem having a control unit, first, second and third storage subsystem, input/output path and a host computer connected to the first storage subsystem. A table 34 stores the attribute information of each logical volume. Part of the table or a column 210 is reserved as a user area column, in which a program running in the host computer connected to the corresponding subsystem can store given attribute information to be set/stored with respect to each logical volume through a dedicated application interface. Consequently, the program comes to easily manage its specific access control, etc. on its own. The access control, etc. are not supported by the control unit of any subsystem. See paragraphs [0061]-[0062].

The reference provides each data storage subsystem with an attribute information copying function, which uses the same data path as that of the data remote-copying function between data storage subsystems. It does not teach a control technique in which:

(1) the first storage device controller receives a data input/output (read/write) request from the first information processing device; and

(2) either (a) if it is determined that the data read request is for data stored on the third storage device, then the first storage device controller transmits the data read request to the second storage device controller, the second storage device controller reads out data stored on the third storage device and transmits the data to the first storage device controller, and the first storage device controller transmits the data to the first information processing device, as recited in independent claims 1 and 9; or (b) if it is determined that the data write request is for the third storage device, then first storage device controller transmits the data write request to the second storage device controller, the first storage device controller transmits write data received from the first information processing device to the second storage device controller, and the second storage device controller writes the write data to the third storage device, as recited in independent claim 5.

8. U.S. Patent Publication No. 2004/0044803 A1

This reference relates to a storage control apparatus and method for controlling the same, having a storage control apparatus comprising: a storage area (A) where data is stored according to a recording format  $\alpha$ , the format  $\alpha$  being a format in which an open computer reads/writes data; a storage area (B) where data is stored according to a recording format  $\beta$ , the format  $\beta$  being a format in which a mainframe computer reads/writes data; a data input/output unit (x) for receiving a data input/output request from an open computer, and inputting/outputting data to/from the storage area (A) in response to a request; a data input/output unit (y) for receiving a data input/output request from the mainframe computer, and inputting/outputting data to/from the storage area (B) in response to the request; and a data recording format conversion unit (X) capable of storing data stored in the storage area A according to the format ( $\alpha$ ) into the data storage area (B) according to the format  $\beta$ . See [0017].

The reference is directed to enabling data stored by a mainframe and data stored by an open system to be efficiently and conveniently provided as data in recording formats that can be used by both the mainframe and the open system. It does not teach a control technique in which:

(1) the first storage device controller receives a data input/output (read/write) request from the first information processing device; and

(2) either (a) if it is determined that the data read request is for data stored on the third storage device, then the first storage device controller transmits the data read request to the second storage device controller, the second storage device controller reads out data stored on the third storage device and transmits the data to the first storage device controller, and the first storage device controller transmits the data to the first information processing device, as recited in independent claims 1 and 9; or (b) if it is determined that the data write request is for the third storage device, then first storage device controller transmits the data write request to the second storage device controller, the first storage device controller transmits write data received from the first information processing device to the second storage device controller, and the second storage device controller writes the write data to the third storage device, as recited in independent claim 5.

9. Japanese Patent Publication No. JP 2002-027373

This reference discloses a data recording and reproducing apparatus provided with first storage means, which stores image data on odd fields to be input from input/output means, a second storage means which stores image data on even fields provided; a third region which stores image data on the odd fields to be input from the input/output means; a control means which controls the read operation and the write operation of the image data.

The reference is directed to data-input-format conversion. It does not teach a control technique in which:

- (1) the first storage device controller receives a data input/output (read/write) request from the first information processing device; and
- (2) either (a) if it is determined that the data read request is for data stored on the third storage device, then the first storage device controller transmits the data read request to the second storage device controller, the second storage device controller reads out data stored on the third storage device and transmits the data to the first storage device controller, and the first storage device controller transmits the data to the first information processing device, as recited in independent claims 1 and 9; or (b) if it is determined that the data write request is for the third storage device, then first storage device controller transmits the data write request to the second storage device controller, the first storage device controller transmits write data received from the first information processing device to the second storage device

controller, and the second storage device controller writes the write data to the third storage device, as recited in independent claim 5.

10. Japanese Patent Publication No. JP 2000-029635

This reference discloses a way to decrease management man-hours by equalizing a disk array where data are stored in common to an interface which connects a main frame and an open system. A fixed-length recording form interface 103 is used as the connection interface between the main frame host 100 and disk array 104. A read/write request part 116 analyzes a CCW chain 113 to recognize a logical record, a track, and a record specified by a read/write request. The specified request is classified by a read request and a write request. Further, a disk cache 112 is searched and a variable-length/fixed-length recording form converting function is implemented to recognize at which part of a disk cache 112 a record in requested variable-length recording form is present. Then the recognized record is transferred to a storage location of a main storage 102 which is specified by the request.

The reference is directed to a fixed-length recording form interface as the connection interface between the main frame host and the disk array. It does not teach a control technique in which:

- (1) the first storage device controller receives a data input/output (read/write) request from the first information processing device; and
- (2) either (a) if it is determined that the data read request is for data stored on the third storage device, then the first storage device controller transmits the data read request to the second storage device controller, the second storage device controller reads out data stored on the third storage device and transmits the data to the first storage device controller, and the first storage device controller transmits the data to the first information processing device, as recited in independent claims 1 and 9; or (b) if it is determined that the data write request is for the third storage device, then first storage device controller transmits the data write request to the second storage device controller, the first storage device controller transmits write data received from the first information processing device to the second storage device controller, and the second storage device controller writes the write data to the third storage device, as recited in independent claim 5.

Appl. No. 10/656,493  
Petition to Make Special

PATENT

(f) In view of this petition, the Examiner is respectfully requested to issue a first Office Action at an early date.

Respectfully submitted,



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